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FEDERAL STANDARD 1063

PROCEDURES FOR DOCUMENT FACSIMILE TRANSMISSION
NATIONAL COMMUNICATIONS SYSTEM
ISSUED BY GENERAL SERVICES ADMINISTRATION
APRIL 14, 1982

EIA STANDARD
PROCEDURES FOR DOCUMENT FACSIMILE TRANSMISSION
RS-466
MAY 1981
Engineering Department
ELECTRONIC INDUSTRIES ASSOCIATION

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This Standard is based upon full agreement with the technical content of CCITT Recommendation T.30 for RS-466. Additionally, it is considered to have standardization implications and interest within 150.

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3 April 1981

FEDERAL GOVERNMENT ADOPTION NOTICE

This EIA Recommended Standard RS-466 PROCEDURES FOR DOCUMENT
FACSIMILE TRANSMISSION has been adopted as Federal Standard 1063.

EIA RS-466
3 April 1981

ACCEPTANCE NOTICE

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NOTICE: Certain provisions of this standard are the subject of international standardization agreement STANAG 5000, Interoperability of Tactical Facsimile Equipment, implemented by MIL-STD-188-161, Design Standards for Common Long Haul and Tactical Facsimile Equipment. When reaffirmation, amendment, revision, or cancellation of this standard is proposed, the military coordinating activity shall take appropriate action through military international standardization channels, including Departmental Standardization Offices, as required.

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PROCEDURES FOR DOCUMENT FACSIMILE
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PROCEDURES FOR DOCUMENT FACSIMILE TRANSMISSION

(From EIA Standards Proposal No. 1302-A, formulated under the cognizance of EIA TR-29 Committee on Facsimile Systems and Equipment.)

1.0 Scope

1.1 Procedures for Document Transmission

This Standard is concerned with the procedures which are necessary for document transmission between two facsimile stations operating on voice band analog circuits. These procedures essentially comprise the following:

- call establishment and call release
- compatibility checking, status and control command
- checking and supervision of line conditions
- control functions and facsimile operator recall
- both recognized optional functions as well as other (non-standard) options

In this Standard two separate signalling systems are described; first a simple tonal system using single frequency tones, and second a binary-coded system offering a much wider range of signals for more complex procedures. For simplicity of implementation as well as immunity to channel perturbations, the binary-coded system modulates between two of the tonal system's frequencies to designate the binary digit 1 and 0 information.

Thus, tonal signalling is to be utilized within simple terminals with limited functions and binary-coded signalling is to be utilized in terminals capable of more comprehensive automatic functions.

Only the procedures with their corresponding signals are specified in this Standard.

1.2 Classification of Operating Methods

For the purpose of originally establishing the facsimile connection, four operating methods are defined herein. Thus, depending on whether the called or calling party is operating in

a manual or automatic mode of operation and whether it intends to transmit or receive, a particular operating method will be chosen. The particular operating method will determine the procedures to begin the interchange of signals between the two terminals. This interchange of signals is commonly referred to as handshaking.

The various operating methods are shown in Table 1. RS-46
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1.3 Related Standards

This Standard defines the procedures to be followed by Group 1, 2 and 3 machines as described in EIA Standard RS-465, and CCITT Recommendations T.2, T.3 and T.4. Thus, all facsimile terminals operating over the General Switched Telephone Network may utilize the procedures defined by this Standard.

1.4 Station Identification

For the purpose of classifying an automatic facsimile station as a non-speech terminal, signals are transmitted upon answering a call. As both automatic calling and called facsimile stations transmit such signals during call establishment, a normal telephone user who becomes inadvertently connected will receive signals for a period of sufficient duration to indicate clearly to him that he is incorrectly connected.

1.5 General Provisions

If any malfunction of the facsimile procedures described in this Standard is detected, the call shall be released.

Where the called station has automatic facsimile apparatus which is not ready or not able to operate, the call shall not be answered automatically.

This Standard includes procedures for not only the mandatory functions required to achieve a compatible facsimile transmission, but also numerous optional features. The procedures to obtain such proprietary manufacturer's options, the ability to switch from facsimile to speech, and the ability to define unique security passwords, are an example of the facilities which may be realized by terminals operating in accordance with this Standard.

2.0 Description of Phases

A facsimile call is made up of five phases. These phases are shown in Figure 1.

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A facsimile call is made up of five phased. These phases are shown in Figure 1.

FIGURE 1

A description of each phase follows:

2.1 Phase A - Call Establishment

Call establishment can be accomplished manually and/or automatically.

2.2 Phase B - Pre-Message Procedure

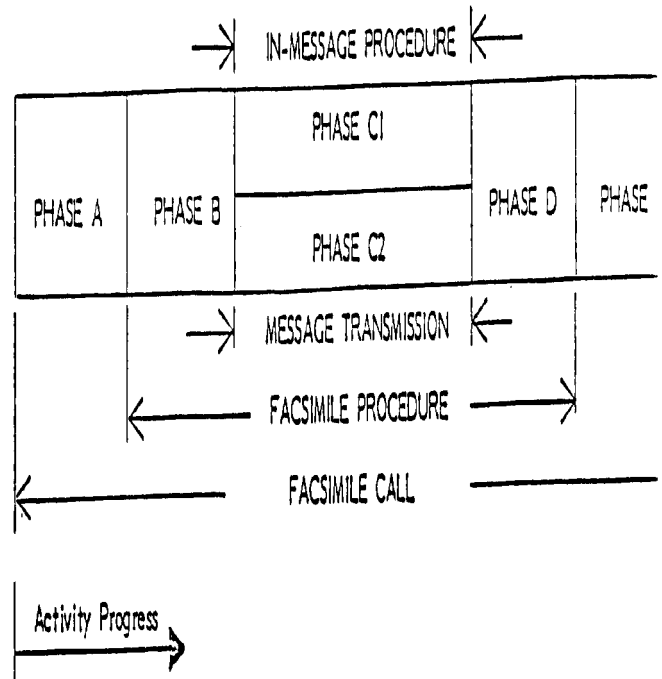
The pre-message procedure consists of the identification of capabilities and the commanding of the chosen conditions as well as the confirmation of acceptable conditions.

When connection is established between apparatus operating in accordance with this standard and apparatus operating in a non-standardized manner, the equipments should disconnect before the in-message procedure unless both equipments include optional, compatible, procedures.

2.3 Phase C - Message Transmission

Message transmission procedure is covered by the appropriate Standard for the equipment. (Reference RS-465 and/or CCITT Recommendations T.2, T.3, and T.4).

2.4 Phase D - Post-Message Procedure



Post-message procedure includes information of end-of-message, confirmation of the reception of the message, and transmission of further message information.

2.5 Phase E - Call Release

Call release shall be accomplished manually and/or automatically.

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3.0 Description of a Facsimile Call

3.1 Phase A - Call Establishment (Note)

The establishment of 2 facsimile call may be realized either manually, if an operator is in attendance, or automatically. To accomplish this, four operating methods have been defined.

Note: See Appendix 2 for abbreviations used in this Recommendation.

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3.1.1 Operating Method 1

Manual operation at both the calling and called station. Figure 2 indicates the operators' actions required to establish a call.

Call Event No.

Calling Station		Called Station	
1	Operator hears dial tone and dials desired number		
2	Operator hears ringing tone	Call rings and operator answers the call	
3	Verbal identification	Verbal identification	
4	Facsimile machine is switched to line	Facsimile machine is switched to	
5	Begin facsimile procedure (see 4. and/or 3. of this Standard)	Begin facsimile procedure (see 4. and/or 5. of this Standard)	

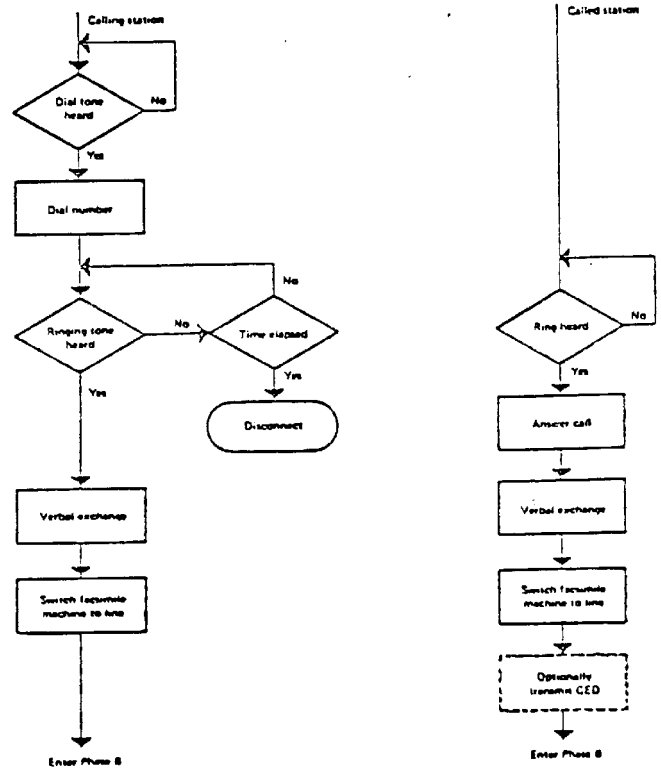


Figure 2 - Call Establishment - Operating Method 1
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3.1.2 Operating Method 2

Manual operation at the calling station and automatic operation at the called station. Figure 3 indicates the operator's and apparatus' actions required to establish a call.

Call Event No.	Calling Station	Called Station
1	Operator hears dial tone and dials desired number	
2	Operator hears ringing tone	
	Equipment detects ring and answers the call.	
3	Optionally, a recorded verbal announcement may be transmitted	
4	Operator hears CED and facsimile machine is switched to line	Transmit CED

5 Begin facsimile procedure (see 4. Begin facsimile procedure (see
 4. and/or 5. of this Standard)
 and/or 5. of this Standard)

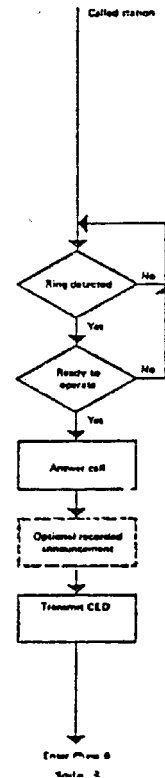
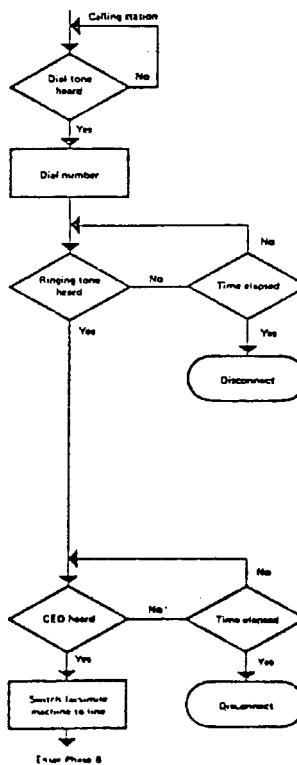


Figure 3 - Call Establishment - Operating Method 2

3.1.3 Operating Method 3

Automatic operation at the calling station and manual operation at the called station. Figure 4 indicates the operator's and apparatus' actions required to establish a call.

Call Event No.	Calling Station	Called Station
1	Equipment detects dial tone and dials desired number. To clearly indicate to a called operator that he is connected to a facsimile machine or to a normal telephone user that he is inadvertently connected, CNC will be transmitted to line during the time that signals are attempted to be detected.	
2		Call rings and operator answers the call
3		Operator detects CNC and switches facsimile machine to line (optionally CED may be generated)
4	Begin facsimile procedure (see (see 5. of this Standard)	Begin facsimile procedure 5. of this Standard)

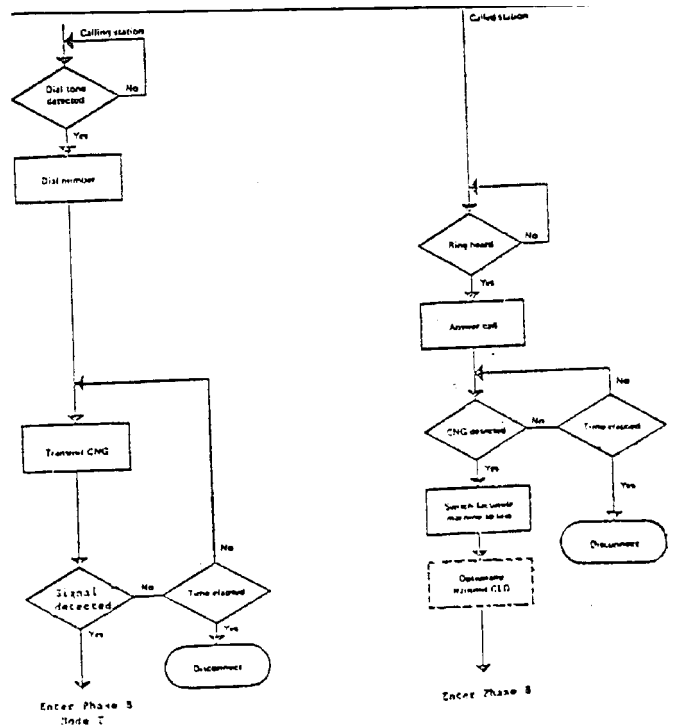


Figure 4 - Call Establishment - Operating Method 3

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3.1.4 Operating Method 4

Automatic operation at both the calling and called stations. Figure 5 indicates the actions required by the apparatus to establish a call.

Call Event No.	Calling Station	Called Station
1	Equipment detects dial tone and dials desired number. To clearly indicate to a normal telephone user that he is inadvertently connected, CNG will be transmitted to line during the time that signals are attempted to be detected.	
2		Equipment detects ring and answers the call
3		Optionally, a recorded verbal announcement may be transmitted
4		Transmit CED
5	Begin facsimile procedure Begin facsimile procedure (see 5. of this Standard) (see 5. of this Standard)	

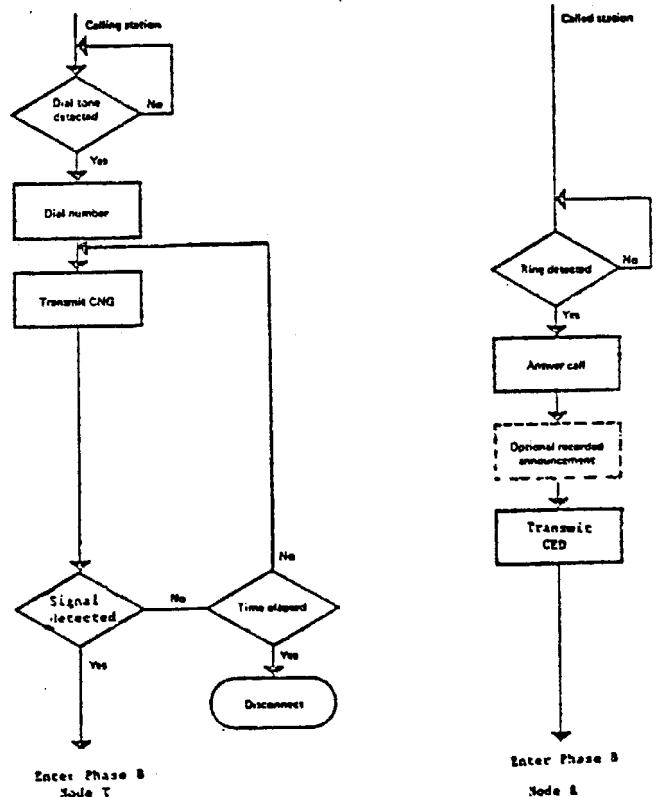


Figure 5 - Call Establishment - Operating Method 4

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3.2 Phases B, C and D - Facsimile Procedure

When entering Phase B, the following rules should be adhered to:

All manual receivers and all auto-answering units must enter Phase B by identifying their capabilities (i.e. Node R of the Flow Diagram in sections 4.2 or 5.2). All manual transmitters and all auto-calling units must enter Phase B prepared to detect the capabilities and issue the appropriate mode setting command (i.e. Node T of the Flow Diagram in sections 4.2 or 5.2). To allow for operating method 2-R, the delay between the transmission of the digital identification signals shall be 4.5 seconds $\pm 15\%$ when sent from a manual facsimile receiver.

The detailed information pertaining to the tonal and binary coded facsimile procedures is contained in 4. and 5. below. The relationship between these two procedures and an overview regarding the total system operation is given in the following:

3.2.1 Interaction Between Tonal and Binary Coded Procedures

Facsimile procedures, as described in this Standard, may be realized in two different ways:

- tonally, with a limited number of tones for simple procedures (see 4. below) and
- binary coded, for more comprehensive procedures (see 5. below).

Binary coded signalling is especially desirable for machines which use:

- comprehensive automatic functions;
- digital concepts internally (e.g. redundancy reduction techniques);
- fast transmission rates (in order to keep pre and post message time short compared to total

transmission time);

- special security features.

The interaction between tonal and binary coded signalling recognizes the principle of the priority of coded procedures such that, when available, binary coded signalling shall be tried first. The interaction steps are as follows:

- The unattended called station shall answer a call with the CED signal.
- The unattended calling station shall indicate a call with the CNG signal.
- Whenever it is capable of binary coded signalling, the called station will start with binary coded signalling.
- Facsimile stations being capable of tonal signalling only will start tonally.
- Facsimile stations being capable of both binary coded and tonal signalling will send a sequence of signals, the first being a binary coded signal and the second and all following signals being a composite of tonal and binary coded information.